



## DFX – Post PRR - Meeting 49

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# DFX – Material procurement planning

- a) SOTON request for sheet metal
- b) SOTON request for plate material
- c) SOTON evaluation of thin wall tubes
- d) List of 3-D forged flanges to be supplied by Abbey Forgings
- e) Update from other suppliers

# DFX – 316LN sheet request

Stainless steel 316 LN		
Thin Sheet		
(1500 mm x 3000 mm)	Quantity of sheets	Uses
1.5 mm	1	Support cage
2.0 mm	0.5	Cryogenic jumper tube
3.0 mm	3	Helium vessel tubes
4.0 mm	5	Vacuum vessel tubes
6.0 mm	1	Domes and thick cone sections

- List assumes that DN219.1 x 2.9 mm tube that makes up most of the helium vessel horizontal length is rolled and welded from 3 mm sheet
- LTi are checking with their suppliers that this tube can be rolled and delivered to LTi for welding

# DFX – 316LN plate request

Stainless steel 316 LN		
<b>Thick plate</b>		
<b>(1500 mm x 3000 mm)</b>	<b>Quantity per sheet</b>	
12 mm	0.5	Waterjet out small flanges
30 mm	1	Thick flanges part of helium volume
50 mm	0.5	Thick flanges with butt weld preps

- Assumed it more efficient (material saving) to waterjet cut flanges from thick plate and machine rather than cutting and machining from round bar

# DFX – 304L plate request

Stainless steel 304L		
<b>Thick plate</b>		
<b>(1500 mm x 3000 mm)</b>	<b>Quantity per sheet</b>	
15 mm	0.5	Waterjet small flanges
20 mm	1	Waterjet small flanges
25 mm	3.5	Vacuum vessel ring flanges
35 mm	1	Clamps and thick ring sections in vacuum volume

- Some further optimisation by tighter nesting and re-using discs cut from bores of large ring flanges can be considered to further reduce the quantities.

# DFX – Evaluation of thin-wall tubes

Stainless steel 316L			
Thin wall tubes			
	Quantity per metre		
6 OD x 1 mm wall	3.5		
8 OD x 1 mm wall	1.5		
12 OD x 1 mm wall	0.5		
14 OD x 1 mm wall	2.5		
18 OD x 1.5 mm wall	0.5		
23 OD x 1.5 mm wall	3		
43 OD x 1.5 mm wall	0.5	44.5 OD x 2 mm wall	Option
63 OD x 1.5 mm wall	0.5		
68 OD x 2 mm wall	0.5	69 OD x 2 mm wall	Option
104 OD x 2 mm wall	3	103 OD x 1.5 mm wall	Option
154 OD x 2 mm wall	0.5	No options available	

- Conservative estimations of tube length rounded to the nearest 0.5 metre
- Due to their mass, is the low cobalt content requirement on thin wall tubes still applicable?
- **GREEN** = Can be sourced from CERN store and in accordance to Technical Spec no. 510 (Low Cobalt is stated within specification)
- **PURPLE** = similar tube available from store

# DFX – List of 3-D forged flanges from 316LN

	Part name	Drawing number	LHC_DFX Code	Quantity	Dimensions	Material Grade	3-D forging
1	Fountain - Large ring flange	ST1175786		1	600 x 36 x 362B	316LN	Yes
2	Helium elbow section - cone flange	ST1175837		1	646 x 53 x 558B	316LN	Yes
3	Helium elbow section - elbow bottom flange	ST1175844		1	440 x 27	316LN	Yes
4	Helium elbow section - receptacle horizontal flange	ST1175873		1	646 x 66 x 425B	316LN	Yes
5	Helium vessel - SC Link adapter flange	ST1177416	LHCDFX_0041	1	300 x 64 x 231B	316LN	Yes
6	Bottom dome connection ring	ST1175969	LHCDFX_0030	1	580 x 64 x 520B	316LN	Yes
7	Cryogenic jumper - inner inlet/outlet welding flange	ST1187765		1	100 x 25	316LN	Yes
8	Cryogenic jumper - inner hydraulic flange	ST1187805		1	100 x 25	316LN	Yes
9	Safety valve - DN100 jumper flange	ST1207019		1	100 x 15	316LN	Yes
10	Safety valve - DN63 CF flange	ST0025923		1	114 x 17.5	316LN	Yes
11	Top dome - level gauge cold flange	ST1177307		1	40 x 20	316LN	Yes
12	Top dome - level sensor port blanking disc	ST1177314		1	40 x 15	316LN	Yes
13	Helium section - horizontal ring flange	ST1194757	LHCDFX_0160	1	470 x 46 x 425B	316LN	Yes
14	Helium section - small weld ring	ST1195832	LHCDFX_0160	1	262 x 39 x 213B	316LN	Yes
15	Helium section - flat reducer	ST1194792	LHCDFX_0160	1	433 x 50	316LN	Yes
16	Helium section - IFS large reducer flange	ST1194688	LHCDFX_0161	1	378 x 50	316LN	Yes
17	Helium section - IFS welded receptacle flange	ST1212964	LHCDFX_0173	1	301 x 47 x 219B	316LN	Yes

## Update from other suppliers

- a) Industeel (Belgium) – cannot supply sheet < 5 mm thick and cannot guarantee Co content < 0.2 %
- b) Nor-Cal contacted to ask about the Co content of their SS316LN standard flanges and if they can be supplied with a material certificate for conformity